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ABSTRACT

Previous studies have shown that students who intend to major in education have low SAT and ACT scores. Further, among those students who intended to major, those who do major have even lower average scores. This study also shows that those students who intend to major in education have lower average high school and college grade point averages. And again among those students who intend to major, those who do major have even lower averages. However, students who intended to teach but not major in education who are then drawn to major in education have higher than average high school and college grade point averages. The result of attracting students to education who initially did not want to major in education is to have an education major that is closer to average than those who initially only intended to major in education. (Author)

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The Academic Achievement of

Freshman and Junior Education Candidates

Dr. James P. Maxwell

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Previous studies have shown that students who intend to major in education have low SAT and ACT scores. Further, among those students who intended to major, those who do major have even lower average scores.

This study also shows that those students who intend to major in education have lower average high-school and college grade point averages. And again among those students who intend to major, those who do major have even lower averages.

However, students who intended to teach but not major in education who are then drawn to major in education have higher than average high-school and college grade point averages. The result of attracting students to education who initially did not want to major in education is to have an education major that is closer to average than those who initially only intended to major in education.

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I. Introduction

The nation depends on its teachers to train and educate the future generation. The nation cannot afford to have incapable and poorly trained teachers providing an inadequate education. Unfortunately, many studies have shown that the teaching profession has failed to attract or retain highly capable students.

This study follows the flow of students into education from freshmen to juniors. The future teachers competency is measured by their high school rank, high school grade point average, and their college grade point average.

There are several paths in and out of the education profession. Many students who intend to teach as a career will not major in education nor intend to major in education as undergraduates. Other students intend to major in education and some of these students do not intend to teach. As freshmen there are four intentions: 1) those who have no interest in education, 2) those who intend to teach and major in education, 3) those who intend to teach, but not major in education, and 4) those who do not intend to teach, but do want to major in education. As juniors, the students may have become education majors. Eight paths are investigated or the education major or not as juniors (2) multiplied by the four freshman intentions.

II. Literature Review

The relatively low test scores of teachers as compared to others is a phenomenon of long standing (Kerr 1983). The average SAT verbal and math scores of college-bound high school seniors who planned to major in education were well below the average for all college-bound seniors tested in 1976 (34 points below average on verbal scores, 43 below average on

math scores) (Weaver 1979). Vance and Schlechty (1982) further stated, "Teaching not only fails to attract the most able, but it also attracts a disproportionate share of the least able." As can be seen in Table 1, education majors have twice as many low quartile SAT students as those not recruited to education. Similarily in 1982, ACT scores were lower for education majors at 17.8 than for non-education majors at 18.3 (Sawyer 1983).

In college the cumulative grade point average is higher for the non-education major (2.97) than for the education major (2.72) (Weaver 1979). The graduating seniors who majored in education average 46 points below average on the verbal section of the SAT and 42 points below average on the mathematical section of the SAT (Weaver 1979). From 1979-82 education majors on the verbal section of the Graduate Record Exam (GRE) have been 12 to 13 percent below all undergraduates, an average of 64 points below. The disparity was worse in the quantitative section where the education students have been 14 to 15 percent below and 72 to 80 points below all undergraduates (Educational Testing Service).

Not only do non-education majors have higher average test scores, but teachers who don't major in education and/or those leaving teaching also have higher test scores. Wagenaar and Takai (1984), found that students who intend to become teachers but major in a different subject area have higher test scores and academic achievement levels than education majors. From Table 1, it is clear that education majors who never taught have higher SAT math scores (485) than teachers (476). Weaver (1979) reporting from the National Longitudinal Study stated that "of education majors, class of 1976,--those not teaching have higher test scores than those teaching (in 4 of 5 measures of competence)". Again,

Table 1

Scholastic Aptitude Test Scores
for Teacher Candidates

	Non-Recruits	Recruits Majored or Taught	Teachers	Non-Teachers (major who didn't teach	Committed Teachers (teachers who intended to teach at 30)	Defectors (teachers who intend to leave by 30)	Confirmed Defectors (teachers who have left)
Verbal							
Lowest Quintile (%)	15	30	30	31	34	25	27
Lowest 2 Quintiles (%)	37	54	55	53	61	48	51
Mean	496	448	447	449	431	462	460
Math							
Lowest Quintile (%)	16	30	31	30	29	32	32
Lowest 2 Quintiles (%)	34	57	59	57	61	56	59
Mean	537	479	476	485	470	483	483

From Vance and Schlecty 1982 from National Longitudinal Survey data.

it is clear that teachers who intend to leave teaching have much higher SAT scores than those who intend to stay. As Schlechty and Vance (1983) say "Average SAT score of teachers decline as they progress through the profession "or as Weaver (1979) calls it the "education brain-drain."

The disparity in scores does not seem to be improving. In 1973, education majors' verbal SAT scores were 6.1% below the national average and fell to 8.2% below the national average by 1981 (Sykes 1983). The ACT English and math scores of the college-bound sample indicate that education majors have declined significantly since 1970, and at a more rapid rate than the national college-bound population as a whole. The teacher scores have fallen at a faster rate than the overall GRE scores since 1970. The National Teacher Examination scores have also declined by 20 points during the five year period from 1969-70 to 1974-75, (Weaver 1979).

III. Data

The data is derived from the 1983 follow-up of the 1981 Cooperative Institutional Research Program (CIRP) freshman survey. The CIRP freshman survey has been conducted annually since the Fall of 1966. This is a stratified national sample that currently includes 600 institutions of varying type and control and includes approximately ten percent of the freshman student population. The initial survey consists of only first-time full-time freshman; see Astin, King and Richardson (1981).

The follow-up survey was begun in 1982 and was designed to follow students two and four years into their school year. The survey used in this study is the second annual follow-up of students who started as full-time freshmen two years before.

The sample consists of 2,340 students which after deleting records for missing information left 2,052 useable records.

IV. Method

Three self reported questions were used to define student achievement. Two were reported as incoming freshman, high school grade point average and high school rank (1-5 where 5 is the highest quintile). The other is college grade point average as juniors.

Three questions were used to define the stream of education majors. As freshmen the students reported whether they intended to teach and whether they intended to major in education. As juniors the students reported whether they were education majors. This results in 8 different education streams. The largest group of students, 87% have never shown any interest in education. The second largest group, 4% have always been interested in education (see Table 2).

Table 2
Averages for All Eight Teaching Paths

	Freshman Intended Major is Teaching	Intended Education Career	Junior Education Major	High School Grade Point Average	High School Rank (1-5)	College Grade Point Average	Percent
1.	No	No	No	3.29	4.24	2.90	87.1
2.	No	No	Yes	3.24	4.21	2.93	3.6
3.	No	Yes	No	3.07	3.77	2.69	.9
4.	No	Yes	Yes	3.62	4.49	3.32	.5
5.	Yes	No	No	3.21	4.01	2.71	.9
6.	Yes	No	Yes	3.22	3.68	2.71	.9
7.	Yes	Yes	No	3.31	3.99	3.15	1.9
8.	Yes	Yes	Yes	3.13	4.06	2.87	4.1
			TOTAL	3.28	4.23	2.90	100.0

The analysis used multivariate analysis of variance to determine whether there was any consistent relationship between the three achievement measures and the eight student flows. Two procedures were used to simplify the results. One was to colapse flows when there was no evidence to justify separating them. The other was to test several hierarchical post-hoc comparisons. In my opinion the pair-wise colapsing of flows as recommended by many text books is confusing (see Maxwell, 1986). The hierarchical comparisons are more interpretable.

V. Results

Most students have never considered education as a career or as a major (87%) and more were not majoring in education as juniors (91%).

However, the percentage of education majors increases from those who intended to major as freshman (7.8%) to those who are majoring as juniors (9.1%). Over a third of the intended majors do not major in education (36%, 2.8% of all students). On the other hand, 45% of the junior education majors did not intend to major in education as freshman (4% of all students). Education gained as majors 4% of the students who initially did not intend to major in education, while losing only 3% of the students.

Some students wanted a career in education, but had no intention of majoring in education (1.4%). Thirty-six percent of these students did later major in education as juniors. Of course some students wanted education as a career and wanted to major in education (6%). Sixty-eight percent of these students were majoring in education as juniors.

Many students were interested in education sometime during their freshmen through juniors years, these 12.9% are the potential teacher candidates. Of these candidates, 32% were junior education majors and as freshman intended to be an education major and pursue an education career. Of these teacher candidates, 32% were attracted to education and were junior education majors who did not intend to major in education as freshmen. Of the candidates, 22% left education and were not junior education majors when they intended to major in education as freshmen.

The eight streams do significantly differ in academic achievements though this accounts for only 2% of the total variance (see Table 4). Differences among streams are much smaller for high school grade point average than for high school rank or college grade point average (see Table 3).

Many differences between the streams are small and the streams should be

aggregated. One way to aggregate streams would be to pool interaction effects if they are found to be insignificant. However, the triple interaction is overall more significant than any of the other sources of variance making it impossible to pool this factor. Two ways are used to reduce the complexity of the 8 streams. First, each stream is treated as one of eight levels in a one factor design. Then post-hoc pair-wise comparisons are done between these levels. Second, the 3 factor design is reconfigured into several hierarchical factors and the hierarchical factors tested.

Pair-wise Comparisons

For the first of three aggregations, Table 5 indicates that there is little difference between students who are not junior education majors and intended to teach or major in education but not both (streams 3 and 5 from Table 2). These students are below average on all 3 measures.

Second, there is little difference between those who are junior education majors whether they intended to both pursue education as a career and as a major or do neither (streams 2 and 8). These two streams are below average for high school achievement but average in college grade point average.

Third, of those who intend to teach, those who changed who either wanted to major but didn't or those who didn't want to major but did have high achievement scores (streams 4 and 7).

Table 6 shows the results of these aggregations. The loss in R^2 is slight and the significance is still strong. There is still, however, one aggregation that should be made (streams 3, 5 with 6). This aggregation includes students who intended to major in education and then did major in education but do not intend to teach with others who are not majoring in

Table 3

High School Grade Point Average

	DF	SS	MS	F	P
Model	7	2,226	318	1.66	.11
Error	2,044	392,542	192		
Total	2,051	394,768			

R^2 = .0056
adj. R^2 = .0022

High School Rank

	DF	SS	MS	F	P
Model	7	8,572	1,225	2.07	.04
Error	2,044	1,209,264	592		
Total	2,051	1,217,837			

R^2 = .0070
adj. R^2 = .0036

College Grade Point Average

	DF	SS	MS	F	P
Model	7	3,561	509	2.26	.03
Error	2,044	460,821	225		
Total	2,051	464,382			

R^2 = .0077
adj. R^2 = .0043

DF: Degrees of Freedom
SS: Sum of Squares
MS: Mean sum of squares
F: F ratio
P: Probability of that F ratio
R^2: Correlation squared which is a measure of the variance accounted for.

Table 4

Source	High School GPA P	High School Rank P	College GPA P	Overall R^2	Overall P
Intended major (A)	.327	.104	.307	.0014	.402
Intended career (B)	.597	.791	.038	.0023	.194
Current major (C)	.337	.490	.311	.0006	.728
A x B	.648	.370	.260	.0024	.170
A x C	.053	.117	.012	.0034	.071
B x C	.235	.058	.380	.0018	.299
A x B x C	.022	.565	.018	.0048	.020
Total	.115	.043	.027	.0204	.005

Table 5

Contrast Between Group	High School Grade Point Average F	High School Grade Point Average P	High School Rank F	High School Rank P	College Grade Point Average F	College Grade Point Average P	Overall F	Overall P	Overall R^2
1,2	.68	.41	.09	.77	.16	.69	.53	.66	.0008
1,3	2.05	.15	3.16	.08	1.73	.19	1.20	.31	.0018
1,4	2.37	.12	.42	.52	3.14	.08	1.42	.23	.0021
1,5	.53	.47	1.57	.21	2.69	.10	1.17	.32	.0018
1,6	.19	.67	4.56	.03	1.33	.24	2.49	.06	.0036
1,7	.08	.78	2.52	.11	6.39	.01	5.07	.002	.0074
1,8	5.9	.02	2.87	.09	.16	.68	2.23	.08	.0033
2,3	1.0	.31	2.38	.12	1.90	.17	1.07	.36	.0016
2,4	2.92	.09	.49	.48	2.56	.11	1.44	.23	.0021
2,5	.05	.83	.89	.35	2.67	.10	1.33	.26	.0020
2,6	.01	.93	3.52	.06	1.50	.22	2.56	.05	.0038
2,7	.49	.48	1.36	.24	3.61	.06	3.31	.02	.0048
2,8	1.43	.23	1.06	.30	.34	.56	.50	.69	.0007
3,4	4.35	.04	2.39	.12	4.89	.03	2.08	.10	.0030
3,5	.58	.45	.55	.46	.02	.89	.25	.86	.0004
3,6	.51	.48	.42	.52	.01	.91	.55	.66	.0008
3,7	1.89	.17	.49	.49	6.0	.01	2.13	.09	.0031
3,8	.14	.71	.97	.32	1.13	.29	.66	.58	.0010
4,5	2.91	.09	1.28	.26	5.36	.02	1.96	.12	.0029
4,6	2.29	.13	3.06	.08	4.49	.03	1.82	.14	.0027
4,7	1.72	.19	1.47	.23	.43	.51	.16	.60	.0009
4,8	4.69	.03	1.20	.27	3.31	.07	1.98	.11	.0029
5,6	0	.95	1.1	.30	0	.99	.77	.51	.0011
5,7	.54	.46	.01	.92	8.52	.04	3.46	.02	.0051
5,8	.41	.52	.04	.84	1.46	.23	1.31	.27	.0019
6,7	.27	.61	1.01	.32	5.34	.02	2.08	.09	.0031
6,8	.30	.58	1.74	.19	.83	.36	2.41	.06	.0035
7,8	2.67	.10	.12	.73	5.46	.02	3.64	.01	.0053
Total	1.66	.11	2.07	.04	2.26	.03	1.99	0	.0204

education but were also equivocal about intending to teach but not major or to major but not teach. Stream 6 like 3 and 5 are below average on the achievement measures.

Little is lost by this aggregation and the significant differences among high school grade point averages has increased (see table 7).

Table 6

Contrast for 5 Main Teaching Paths

Contrast Between Group	High School Grade Point Average		High School Rank		College Grade Point Average		Overall		
	F	P	F	P	F	P	F	P	R^2
1;2+8	5.03	.02	1.86	.17	0	1.00	2.19	.09	.0032
1;3+5	1.98	.16	4.15	.04	4.37	.04	2.11	.10	.0031
1;4+7	.72	.40	1.48	.22	9.05	0	5.84	0	.0085
1;6	.19	.67	4.56	.03	1.33	.25	2.50	.06	.0036
8+2;3+5	.05	.83	1.43	.23	3.56	.06	1.93	.12	.0028
8+2;4+7	3.34	.07	.20	.66	7.27	.01	4.84	0	.0071
8+2;6	.05	.82	2.78	.10	1.24	.27	2.65	.05	.0039
5+3;4+7	2.61	.11	.37	.54	13.20	0	4.77	0	.0028
5+3;6	.11	.74	.71	.40	0	.97	.79	.50	.0012
7+4;6	.63	.43	1.62	.20	6.21	.01	2.34	.07	.0034
Total	1.96	.10	2.85	.02	3.76	0	3.15	0	.0183

Mean Group	1	2+8	3+5	4+7	6
HS GPA	3.29	3.19	3.17	3.36	3.22
HS Rank	4.24	4.14	3.93	4.06	3.68
Col GPA	2.90	2.90	2.70	3.18	2.71
Percent	87.1	7.7	1.8	2.4	.9

Fg, 5864 = .47 for change in model from 8 to 5 groups. Not significant

Another aggregation to three paths could be made but the significance between high school grade point averages is lost in this aggregation (see Table 8).

Students differ more in their college grade point averages than in either of the high school achievement measures, see Table 6 or Table 3. The greatest contrast is between the group with the lowest college grade point average

and the group with the highest college grade point average. The high average group are those who intend to teach as a career and have either changed from intended education major to nonmajor or from not intended education major to major. The low group are not junior education majors who appear to be inconsistent as freshman, they either intended to major in education or intended to have a career in education but not both. The other streams have average college grade point averages between these extremes and some are significantly different from one or the other of the two extremes.

In Table 7, the significant difference for high school rank is between the highest and lowest average group. The highest average high school rank is among those students who never considered education as a major or career. The lowest high school rank are students who both intended to major and then did major as juniors but don't intend to teach. The next lowest high school rank are students who weren't junior education majors but had intended to either teach or major but not both. It should be noted that the highest stream, stream 4, was aggregated with stream 7, a low group. From Table 5, even though stream 4 has the highest average rank, the stream is too small to show significance.

The only significant difference between the high school grade point average is between the largest groups. Students who never intend to teach or major have high, high school grade point averages but not the highest. These students have significantly higher, high school averages than education majors who wanted to teach and major in education or education majors who neither wanted to teach or major (who are not the lowest).

Table 7

Contrast for 4 Main Teaching Paths

Contrast Between Group	High School Grade Point Average		High School Rank		College Grade Point Average		Overall		
	F	P	F	P	F	P	F	P	R^2
1,2+8	5.04	.02	1.86	.17	0	1.00	2.19	.09	.0032
1;3+5+6	2.05	.15	7.91	.01	5.65	.02	3.78	.01	.0055
1;4+7	.72	.40	1.48	.22	9.05	0	5.84	0	.0085
8+2;3+5+6	.01	.93	3.06	.08	4.34	.04	3.36	.02	.0049
8+2;4+7	3.34	.07	.20	.66	7.27	.01	4.84	0	.0070
5+6+3;4+7	2.57	.11	.95	.33	14.99	0	5.12	0	.0075
Total	2.58	.05	3.57	.01	5.01	0	3.93	0	.0172

Mean Group	1	2+8	3+5+6	4+7
HS GPA	3.29	3.19	3.18	3.36
HS Rank	4.24	4.14	3.87	4.06
Col GPA	2.90	2.90	2.71	3.18
Percent	87.1	7.7	2.3	2.4

$F_{3, 5410} = 2.02$ for change in model from 5 to 4 teaching paths. Not significant.

Table 8

Contrast for 3 Main Teaching Paths

	High School Grade Point Average		High School Rank		College Grade Point Average		Overall		
	F	P	F	P	F	P	F	P	R^2
1+2+8,3+5+6	1.79	.18	7.60	.01	5.67	.02	3.78	.01	.0055
1+2+8,4+7	.86	.35	1.36	.24	9.07	0	5.83	0	.0085
3+5+5,4+7	2.56	.11	.95	.33	15.00	0	5.12	0	.0075
Total	1.35	.26	4.42	.01	7.52	0	4.80	0	.0140

Mean Group	1+2+8	3+5+6	4+7
HS GPA	3.28	3.18	3.36
HS Rank	4.24	3.87	4.06
Col GPA	2.90	2.71	3.18
Percent	94.8	2.3	2.4

$F_{3, 49.79} = 5.40$ for change in model from 4 to 3 teaching paths. Not significant.

Hierarchical Comparisons

Forty-two hierarchical effects were tested. The hierarchical effects are interpretable in terms of the original factors in the three way design. The pair-wise analysis can not be interpreted in terms of the original factors. Table 9 shows the significant hierarchial comparisons. Tables 10-11 display the most significant of these comparisons. The major significant interaction for high school grade point average is for students who intend to become teachers, see Table 10. The students that change their minds and either become junior education majors when they originally did not intend to major in education or they didn't major in education as they had intended; these are the students with the highest high school grade point averages.

The major effect for high school rank is for students who do not want to major in education. If these students also do not want to major in education, regardless of whether they do or do not as juniors, then they have higher high school ranks than those who do want to major in education.

Six effects are significant for college grade point average (see Table 11). The first effect is the interaction that was significant for high school average. Again, for students who want a career in education, students who change their mind and either become junior education majors when they hadn't intended to or do not major in education when they had intended to; these are the students with the highest college grade point averages.

The second significant relationship for college grade point averages is among students who are not currently majoring in education. Students who intended to major and teach have lower averages than those who just wanted to major but did not or teach but not major.

Third, switching students who didn't major in education but intended

to or majored in education but didn't intend to will have higher college grades if they intend to teach than those who do not intend to teach.

Fourth, the triple interaction effect shows that those with no intention to teach have lower college grade point averages if they majored in their intended field than if they did not major in their intended field.

Fifth, students who initially didn't intend to teach and are now an education major will have lower averages if they intended to major in education as compared to those who didn't intend to major in education. On the other hand, students who intended to teach but are not education majors have higher averages if they did not intend to major than those who didn't.

And sixth, among students who intend to major in education, those who intend to teach will have higher college grade point averages than those who do not intend to teach.

All of these factors are correlated. In this way they are like looking at the same relationship from several perspectives. Some of the factors are independent in the sense that they would be uncorrelated if the design were balanced. By number then these factors are 1 and 6, 3 and 5, and 2 and 4. In other words, the 6 relationships can be accounted for by 2 relationships but there are three different ways to break the 6 into 2 factors.

Table 9

Significant Contrast Probabilities

Source*	High School Grade Point Average	High School Rank	Grade Point Average	Overall
$AB_1(A,B)$				.028
$B_2(A)$		.0241		
$C_1(A)$		.0475	.0284	
$ABC_2(A)$		.0299		
$BC_1(AB,AC)$	.0234		.0193	
$BC_1(B,C)$			.0329	
$A_1(B)$			.0098	.024
$ABC_2(B)$			.0047	.045
$AC_2(AB,BC)$			.0039	.017
$A_2(C)$			.0250	
$AB_1(C)$				.028
$BC_2(AB,AC)$			.0085	.038
$AC_1(AB,BC)$		.0297		.046
$C_2(AB)$			.0033	.034
$AB_1(AC,BC)$			.0255	.040
$B_1(AC)$	.0107		.0033	.011
$A_2(BC)$	.0267		.0393	
Total	.1146	.0434	.0274	.005

*This is hierarchial coding. $B_2(A)$ is the A effect within the second level of B. The interactions in this design also have two levels, thus $(BC)_2(AB,AC)$ is the AB or AC interaction within the second level of the BC interaction.

Table 10

High School Grade Point Average
Intended Career is Education
$B_1(AC)$

		Intended Major is Education	
		No	Yes
Junior education Major	No	3.1	3.3
	Yes	3.6	3.1

High School Rank
Intended Career is not Education
$B_2(A)$

		Intended Major is Education	
		No	Yes
Junior education Major	No	4.2	4.0
	Yes	4.2	3.7

Table 11

College Grade Point Average

1. Intended career is education
$B_1(AC)$

		Intended Major is Education	
		No	Yes
Junior education Major	No	2.7	3.2
	Yes	3.3	2.9

Interaction

2. Major is not Education
$C_2(AB)$

		Intended education Major	
		No	Yes
Intended To Teach	Yes	2.9	2.7
	No	2.7	3.2

3. Interaction between intended major and junior major
$AC_2(B)$

	Intended to Teach	
	No	Yes
Became a Major but didn't intend to	2.9	3.3
Intended to major but didn't	2.7	3.2

4. Triple interaction
$ABC_2(B)$

	Intended to Teach	
	No	Yes
	Majored in intended field	Didn't major in intended field
	2.9	3.2
	2.7	3.3

Table 11 (continued)

5. Interaction between intend to teach and majoring in education
$BC_2(AB,AC)$

	Intended Major is Education	
	No	Yes
Didn't Intend to Teach but did Major	2.9	2.7
Intended to Teach but didn't Major	2.7	3.2

6. Intends to Major in Education
$A_1(B)$

		Intends to Teach	
		No	Yes
Junior	No	2.7	3.2
Major in Education	Yes	2.7	2.9

VI. Conclusions

This study examined the flow of teachers into the profession in terms of the high school grade point average, high school rank, and college grade point averages they received. Most students do not consider education as a career or major (87%) though many (12%) do consider education either intending to major or pursue education as career or eventually majoring in education. Some students wanted as freshman to pursue education as a career and major, and two years later were majoring in education (4%).

Most of the variation in academic rank and grades is not due to which stream the student chose. The stream accounted for is just 2% of the variance in academic ranks and grades. The strongest relationship is the triple interaction.

One way to describe a triple interaction is to treat all flows as levels

of a single factor. The most significant finding is the relationship between the student who had no interest in education and those who wanted to teach and were attracted into or left education. The student who originally did not intend education as a major but did want a career in education--and then later decided to major in education has the highest academic grades and rank of all groups of students. The student who intended to major in education and want a career in education but did not major in education also have high grade point averages in high school and college but below average high school rank.

Another way to describe triple interactions is to describe post-hoc comparisons of two-way effects in levels of another factor. This hierachical structure and several others can be tested. The strongest effect consistent for both high school and college average grades is that students intending a career in education but initially did not intend to major in education, if those students major in education they have higher average grades than those who don't major. Conversely, those students intending education as a career and intending to major in education have lower grades when they major in education than those who don't major in education.

Previous studies have found that students who intended to major in education have low SAT and ACT scores. This study also shows that those students who intend to major in education have lower than average high school grades and high school ranks.

Previous studies show that among those students who intended to major in education and then did major, these student have lower SAT and ACT scores than those who decided not to major in education. This is called the "brain drain", the smartest among those who intended to major, do not major in education. Again, this study also shows that those who decide not to major

in education when initially they had intened to, have higher high school grade point averages.

Previous studies did not look at students who intended education as a career but did not want to major in education. The students in this group who decided to major in education had the highest average high school grades and ranks of all groups and eventually the highest average college grade point average.

In summary, though education is losing the brightest of the students who intended to major in education, education is attracting larger numbers of bright students who initially didn't intend to major in education. As a result, those actually majoring in education as juniors are closer to the average student in college than those who intended to major in education as freshman.

There are bright students interested in education who initially do not want to major in education. Education schools should continue to find these highly qualified students and encourage these students to major in education.

The findings in this study should be replicated. The CIRP has conducted other follow-up surveys. Perhaps education has attracted good students in other years as well. Even more important than attracting education students is retaining good students to graduation and the CIRP 4-year follow-up may be useful for this purpose. The High School and Beyond data could also be used to replicate these findings.

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